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MATTERS RELATING TO COMMITMENTS

METHODOLOGICAL ISSUES

Addendum

ALLOCATION AND CONTROL OF EMISSIONS FROM BUNKER FUELS

Note by the interim secretariat

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I. INTRODUCTION

A. Committee discussion

1. At the eighth session of the Committee, Working Group I held a preliminary discussion on the issue of emissions from the use of fuels for international aviation and marine transport. In accordance with the practice in energy statistics, such fuels are also referred to as "bunkers", or "international bunkers". In document A/AC.237/34, which reviews the work of the Intergovernmental Panel on Climate Change (IPCC) on methodologies for calculation/inventories of emissions and removals of greenhouse gases, this issue was signalled as one with special policy implications on which the IPCC needed guidance from the Committee.

2. In its work on developing methodologies for inventories, the IPCC recognized that the treatment of data on bunkers in national energy statistics is inconsistent between countries and that, to a large extent, bunkers are treated as separate categories outside of national accounts. For the time being, the IPCC advises that emissions from international bunker fuels should be included in national inventories under "fuel combustion activities", recognizing that a procedure for allocating these emissions will be agreed upon in the future. Following the practice used in United Nations energy statistics, they should be listed separately, but together with national totals.

3. During the eighth session, there was general agreement in the Committee that bunkers should be included in the inventory reporting procedures to be considered by the first session of the Conference of the Parties (COP 1), but the need for further information and discussion was emphasized. The Committee therefore requested the interim secretariat, in cooperation with the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), to provide policy options for allocation and control of emissions from bunker fuels for consideration at the ninth session (see A/AC.237/41, para. 41).

B. Contributions from other organizations

4. The interim secretariat has received information through officially published sources and the secretariats of ICAO, IMO, the United Nations Economic Commission for Europe (ECE), the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA), the International Air Transport Association (IATA), and from the United Nations Statistical Office, as well as from a number of institutes and universities.

5. The ICAO secretariat stressed the need to find a feasible and equitable allocation method. This organization also provided information about its current work on greenhouse gas emissions from aircraft, as well as studies related to the Montreal Protocol on Substances that Deplete the Ozone Layer, which could be of additional interest in the context of the Convention. Further, ICAO stressed that whatever allocation method is chosen, it would have to be designed in such a way as to facilitate the control of emissions of different greenhouse gases.

6. The IMO secretariat reported that the question of allocation/control of emissions from bunker oil was raised by Governments at the thirty-fourth session of the Marine Environment Protection Committee in July 1993 and at the twenty-third session of the Subcommittee on Bulk Chemicals in September 1993. This question has, to date, received very limited attention within IMO, but the Subcommittee agreed to consider the matter in detail during its next meeting, which is tentatively scheduled for 19-23 September 1994.

7. The OECD and IEA secretariats saw the need for a significant study on the emissions of carbon dioxide (CO_2) and other gases from bunkers, their importance for changes in the global atmosphere, and the technical and policy options for reducing them. The results of such a study could provide the basis for developing realistic options for allocating emissions in ways which are likely to encourage reductions.

8. ICAO, IMO, and the other organizations mentioned above, expressed their interest in further contributing, within the context of their mandates and programmes, to any ongoing work related to the Convention and to emissions of greenhouse gases from international transport.

C. Scope of the note and possible action by the Committee

9. The present note is designed to facilitate a discussion of the different options for the allocation of emissions from bunker fuels. Section II provides some general information on emissions from fuels for international aviation and marine transport and on factors influencing such emissions. Section III provides a short explanation of the concept of bunkers in energy statistics, followed by a listing of options for allocating CO_2 emissions from bunker fuels to national inventories. For these options, the interim secretariat offers some comments on their feasibility and, to the extent that they are relevant to the allocation of emissions, on the control of emissions.

10. There are several options for the allocation of emissions from bunker fuels. The following criteria could be used to evaluate such options:

(a) Whether emissions from fuels sold to international air and sea transport should be treated, either:

- Similarly to emissions from other fuel deliveries, that is, allocated to the country responsible for the economic activity that results in the consumption of the fuel (see options 3 and 4 in section III.B below);

or

- Differently from emissions of other fuel deliveries (see options 1, 2, 5 and 6 in section III.B);

(b) The feasibility, for the country to which the emissions would be allocated, of implementing effective control measures; and

(c) The expected availability of reliable data on national contributions to the emissions of the different gases.

11. Choosing between the options implies much more than applying methodological criteria: all of the allocation options raise concerns of one kind or another and many are political and economic in character. The Committee may wish to consider whether it can fully take up this issue at its ninth session or if -- in the light of other more pressing issues -- it could agree to accept, on a provisional basis and without prejudice to any future decision on allocation, the proposed IPCC reporting instructions on this issue (see paragraph 2 above). Further discussion on this matter would be left to the COP and its subsidiary bodies. Furthermore, the Committee could invite ICAO, IMO, the IPCC and other relevant bodies to continue, and even intensify, their work on emissions from international transport, with a view to contributing to the implementation of the Convention, and to keep the interim secretariat informed of progress. Under such a scenario, the Committee could recommend to COP 1 that the COP should provisionally endorse such an approach while also directing one, or both, of the subsidiary bodies to advise it on a more permanent solution to the problem. Meanwhile, States could develop a better understanding of this issue as related to their national situations.

II. SCIENTIFIC AND TECHNICAL ASPECTS OF EMISSIONS FROM BUNKER FUELS

A. Emissions from international bunkers

12. As with the combustion of other fuels, combustion of bunker fuels gives rise to the emission of several pollutants, of which CO_2 is a major one. The conversion of fuel use data to CO_2 emissions data is quite straightforward. Marine and aviation bunker fuels are estimated to be responsible for a few per cent of global emissions of CO_2. For many countries, including CO_2 emissions from bunker fuels in national accounts would only constitute a minor increase in estimated national CO_2 emissions. National and regional differences can, however, be substantial. For example, adding emissions from bunker fuels to the national accounts of some smaller countries with major harbours and airports would, according to fuel sales statistics, add over 50 per cent to the estimated CO_2 emissions from fuel consumption.

13. Developing estimates of emissions of other greenhouse gases and relevant pollutants from bunkers (CO, CH_4, N_2O, SO_x, NO_x, H_2O, volatile organic compounds (VOCs)) is generally much more difficult. Moreover, in some cases the resulting changes in atmospheric composition may depend considerably upon the location of emissions, while the resulting contribution to climate change may be difficult to assess. At present, national emissions inventories do not generally include such emissions.

14. As with emissions from other sectors, CO_2 from transport is considered to be of global rather than local concern, lowering the importance of the geographical and spatial location of the emissions. However, the importance of the location of emissions of water vapour and NO_x from aviation is less clear, because of the way these emissions are injected into the more stable upper atmosphere. This might aggravate the effects of such emissions and these questions are therefore given high priority in research supported by ICAO in cooperation with the IPCC.

15. In the ECE region, emissions of SO_x and NO_x from the transport sector are handled in the context of the ECE Convention on Long-Range Transboundary Air Pollution to combat acidification and increased nitrogen loading of terrestrial areas and coastal waters. However, emissions from international transport are seen as outside the scope of this regional agreement.

16. Emissions of NO_x and VOCs arise from aviation as well as from marine transport. Apart from direct effects, such as their contribution to acidification, these emissions may contribute to the formation of ozone in the lower atmosphere, and possibly to ozone destruction in the stratosphere, processes that could both contribute to climate change. The emissions depend heavily on engine design, including the temperature under which the combustion of fuel takes place. Energy efficiency has always been a major consideration in engine design and, in terms of the amount of fuel used per available seat-kilometre, some aircaft types are already today more than twice as efficient as others. However, the search for improved energy efficiency has resulted in higher working temperatures in engines and, under these conditions, NO_x emissions tend to increase. Meanwhile, ICAO has recently made its emissions standards for NO_x from new aircraft engines more stringent and is now looking at the scope for further increases in stringency, although progress will, to some extent, depend on a better understanding of the influence of aircraft engine emissions.

B. Factors influencing emissions

17. The emissions of greenhouse gases from international transport are influenced by many factors, including the volume of transport activities and the technical aspects of fuel quality, engines and fuel efficiency. The speed of the transporting vehicle is also important: for example, the doubling of ship speed after the introduction of modern container traffic has, in many cases, meant an eightfold increase in specific fuel use.

18. Fuel prices influence both the location of fuel purchase and the overall volume of transport activities. Ships have large fuel storage facilities, and price differentials between harbours exert a major influence on the decision to buy fuel in one harbour or another. Aircraft, however, usually limit fuel uptake to the requirements for a one-way flight because of fuel efficiency considerations, although on short-haul flights aircraft may carry sufficient fuel for several stops. This means that fuel uptake in the aviation transport sector may tend to cancel out between some countries, when incoming and outgoing aircraft are considered. While international aviation fuel is largely free from taxation (in accordance with ICAO resolutions), price differentials do exist between countries and airports and these certainly have some impact on fuel purchasing.

19. Fuel consumption in the air transport sector is expected to grow over the next decade. In the longer term, this might also be true for marine transport, bearing in mind the upward trend in world trade and economic growth in developing countries.

III. ALLOCATION AND CONTROL OF EMISSIONS FROM BUNKER FUELS

A. The concept of "bunkering" in energy statistics

20. The term bunkers, according to the United Nations recommendations for energy statistics, refers to fuels used by transport operators whose activities take place partly or wholly outside the territory of a given country. The obvious example is ships engaged in the carriage of passengers or freight to other countries. By extension, the concept also covers air, road and rail transport that crosses national frontiers. In the case of ships, the concept also includes fuel used by warships and by fishing vessels, but fishing and water transport in territorial waters and on inland waterways are considered to be domestic consumption.

21. According to the United Nations recommendations for energy statistics, bunkers taken on board abroad by nationally registered carriers should theoretically be treated as imports by the country under consideration. Bunkers supplied by the country under consideration to foreign-registered transport companies should be treated as "export-like" bunkers. Such a practice would correspond to common procedures for balance-of-payments statistics.

22. In practice, this extra-territoriality aspect of bunkers causes problems in national and international statistics. It is common practice that all deliveries of fuel for international transport are classified as bunkers, while fuel acquired abroad is ignored. In keeping with this practice, the United Nations energy statistics list air bunkers and sea (or marine) bunkers separately from national consumption, which is derived from data on the amount of fuel sold within the country. The energy statistics of OECD/IEA and of EUROSTAT, the Statistical Office of the European Community, likewise list international marine bunkers as a separate category, but include international air bunkers in the national accounts. All fuels used for road and rail transport are included in national accounts.

B. Options for allocation

23. Based on the discussions at the eighth session, together with the information received from different organizations, several options for the allocation of CO_2 emissions are identified below. The extent to which these options would be appropriate for the allocation of emisssions from other gases is not known. Some considerations on possible implications for the control of emissions are also offered. However, many of the options raise significant political, economic and equity issues that are not addressed here. The focus is on technical feasibility, particularly in the short term. If the Committee were to decide to take up this issue at the ninth session, and to pursue any of the options for recommendation to the COP, it would be important to proceed in close collaboration with relevant organizations. Alternatively, as suggested in paragraph 11 above, the Committee might decide to accept provisionally the proposed IPCC reporting instructions on this issue and leave further discussion on this matter to the COP and its subsidiary bodies.

24. **Option 1: Allocation of emissions from the use of bunker fuels to the country in which the bunker fuel is sold.**

25. This option would rely on existing data sets that are already provided by Governments to bodies such as the United Nations Statistical Office. It would therefore have the advantage of being straightforward from a technical perspective.

26. As far as control measures are concerned, countries supplying fuel for international transport may find it difficult to exert control on foreign flag vehicles. Further, fuels purchased in non-Annex I Parties would initially be outside any control scheme, possibly allowing for a shift in the place of purchase with no overall reduction in emissions. Thus, control of emissions under this option might require an international agreement to coordinate or harmonize international actions.

27. **Option 2: Allocation of emissions from the use of bunker fuels to the country in which the bunker fuel is sold, but listing these in separate accounts.**

28. This option would be as feasible as option 1 as it also relies on existing procedures for energy statistics. Moreover, it also corresponds to the provisional reporting recommendations for bunker fuels from the IPCC.

29. This option might provide limited incentives for Governments to reduce emissions from international transport as these emissions would be separated from national commitments. As in option 1, some form of international agreement for the control of emissions might be required.

30. **Option 3: Allocation of emissions from the use of bunker fuels according to the nationality of the transporting company.**

31. This option would require entirely new procedures for the collection of statistical data. Although feasible in principle, only those countries that have to provide national communications might provide data. They would have to require their transport companies to supply data on annual fuel consumption. This would constitute an additional administrative demand on these transporters, such a demand not being shared by transporters in all countries.

32. When considering this option it should be kept in mind that nationality is a concept of decreasing relevance for companies involved in international trade. Even though a transporting company may seem to have a national profile or background, the company that is formally involved in the trading may have a different nationality; it may, for example, be the national affiliate of a foreign-based company. It may be noted that even for air carriers, where national identification has traditionally been strong, the tendency is towards privatization and internationalization, thus loosening the relation to national responsibilities. The United Nations Conference on Trade and Development has signalled that for transnational corporations the attribution of nationality to companies has, in many cases, become less meaningful.

33. Another aspect to be considered is that control measures that are confined to Annex I Parties might merely result in a shift of activities to other countries without benefit for the global environment.

34. **Option 4: Allocation of emissions from the use of bunker fuels to the country where a ship or aircraft is registered.**

35. As with option 3, this would have to rely on the development of entirely new procedures for the collection of statistical data. This would be further complicated by the fact that the nationality of vehicles (ships or aircraft) is not always obvious in practice. Because of leasing and the practice of foreign flags in shipping, a transport company may operate vehicles of different nationalities.

36. A more substantive problem with this option is that registrations depend heavily on financial considerations, especially for marine transport, and registrations are easily changed. A country attempting to enter into discussions on control measures might find it difficult to identify real partners for such discussions, or may even find that registrations are simply transferred to another country.

37. **Option 5: Allocation of emissions from the use of bunker fuels to the country of destination of cargo or passenger.**

38. This option would have to rely on special and complicated procedures for data collection. Furthermore, it may be difficult to identify the final destination unequivocally. For instance, marine transport to a landlocked country will always have an intermediate destination in another country.

39. Under this option, the array of effective policies and measures may be even more limited than for other options, since the transporting vehicle is not of direct concern. Market instruments, such as taxes, could be applied, but these would need to be consistent with international trade agreements.

40. **Option 6: Allocation of emissions from the use of bunker fuels to the country of origin of cargo or passengers.**

41. For this option, problems similar to those with option 5 could be envisaged.